# THE CAMPANULACEAE OF OHIO[1]

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In Ohio the family Campanulaceae is represented by three genera: *Campanula*, *Lobelia*, and *Specularia*; and eleven species, of which five are common throughout the state and two are quite limited in their distribution.

Following the key to species each species is briefly described, and distribution, common names, chromosome numbers, if known, and other pertinent data are given. Chromosome numbers are those given in Darlington and Wylie (1956) and in the papers of Bowden (1959a, 1959b). Average time of flowering is indi-

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cated as well as the extreme flowering dates as determined from a study of herbarium material. The genera and species are arranged alphabetically. Distribution maps are included. A dot represents a collection of a particular species in a given county. No attempt has been made to indicate the general area of collection within the county, as a majority of herbarium specimens do not have this information. It should also be pointed out that many of the collections examined are forty or more years old and thus the distribution maps do not necessarily indicate present distribution.

The taxonomic treatment follows that of *Gray's Manual of Botany, 8th Edition* (Fernald, 1950) for the genus *Campanula*, except in the case of *C. aparinoides* Pursh for the reasons discussed below. Treatment of the Genus *Lobelia* follows that of McVaugh (1936) and Fernald (1950) except in the case of *L. spicata* Lam., as discussed below. The generic epithet *Specularia* is retained in preference to *Triodanis*, as recognized by McVaugh (1945) and others, to avoid confusion with eastern manuals and floras, which generally recognize *Specularia*.

The following work is based on a study of herbarium specimens supplemented by my observations and collections in the field during the summers of 1957 through 1960. I have done no experimental work; however, Bowden (1959b, 1960a, and 1960b) has studied the Genus *Lobelia* cytotaxonomically.

I would like to thank the curators of the following herbaria for the loan of material used in this study: Bowling Green State University, Kent State University, Miami University, Oberlin College, The Ohio State University, Ohio University, Ohio Wesleyan University, University of Cincinnati, and The University of Michigan (for slips on the material in the herbarium). I would also like to express my thanks to Dr. T. R. Fisher of The Ohio State University, Dr. H. G. Baker of The University of California, and Dr. George Goodman of The University of Oklahoma for their helpful criticism of the manuscript.

## *CAMPANULACEAE*, BELLFLOWER FAMILY

Herbs with milky juice; leaves alternate, without stipules, simple; corolla 5-lobed, regular or irregular; petals united at least at the base; flowers epigynous, solitary or clustered in racemes, panicles or cymes, often quite showy; anthers free or joined in a long tube around the style; carpels united, style 1, ovulary with 2 to 3 locules; fruit a many-seeded capsule.

*Key to the Genera*

1. Corolla irregular; capsules opening at the top ..... *Lobelia*
1. Corolla regular; capsules not opening at the top ..... 2
2. Leaves orbicular to obovate, clasping the stem with cordate bases; flowers sessile in the axils; pores of the capsule sub-median ..... *Specularia*
2. Leaves linear, lanceolate or oblanceolate, narrowed to the stem, if obovate, with pedicels; pores of the capsule either sub-apical or basal ..... *Campanula*

## *CAMPANULA* L., BELLFLOWER

Corolla generally campanulate, 5-lobed, regular; stamens 5, separate, the filaments broad at the base surrounding the style; stigmas and locules 3; the capsule opening by pores at the base or near the top; flowers terminal or axillary.

1. Leaves broad and large, lanceolate to ovate; inflorescence spike-like; flowers terminal and axillary, large and showy ..... 2
1. Leaves narrow and/or small, mostly linear to narrowly lanceolate, some oblanceolate; flowers terminal ..... 3
2. Style straight; corolla campanulate; calyx pubescent (occasionally glabrous); capsule with pores at the base, usually pendulous ..... *C. rapunculoides*
2. Style declinate; corolla rotate; calyx glabrous (rarely with a few conspicuous trichomes); capsule with pores sub-apical, not pendulous ..... *C. americana*
3. Flowers small, inconspicuous (7 to 12 mm long), white to bluish; stems retrorsely scabrous ..... *C. aparinoides*
3. Flowers larger, conspicuous (1.5 to 2.7 cm long), blue; stem smooth ..... *C. rotundifolia*

*Campanula americana* L. Tall Bellflower. Annual, 0.5 to 2 m high; stem glabrous to sparsely pubescent; leaves alternate, decreasing in size upwards, oblanceolate, blade tapering to a long petiole, ending abruptly in the var. *illinoensis* (Fresn.) Farw.; flowers 1 to several in the axils of much reduced upper leaves forming a long interrupted spike-like raceme; corolla blue, rotate, 2.0 to 2.5 cm long; capsule upright, opening by pores near the top. 2n = 102.

N. Y., s. Ont. to S. D., south to Fla., Ala., and Okla. Probably in every county in the state (fig. 1), in damp and/or shaded habitats. Infrequently in apparently drier situations. July to early August. June 28 (1896) to September 7 (1959).

Specimens approaching *C. a.* var. *illinoensis* have been examined from several localities and Fernald (1950) lists this variety from Ohio. This variety may not be as distinct in Ohio as it is farther west.

*Campanula aparinoides* Pursh. Marsh Bellflower. Stems weak, often three angled, retrorsely scabrous on the angles, usually reclining on the ground or on surrounding vegetation, usually branched; leaves scattered, narrowly lanceolate, dentate, and the smaller often entire; flowers terminating long naked peduncles; corolla blue to white, 5 to 12 mm long, campanulate.

Que. to Sask., south to Ga., Ky., Ia., and Neb. An uncommon species; bogs and other wet habitats. Reported from 22 counties (fig. 2). July to August. June 26 (1890) to September 10 (1892).

On the basis of Ohio material it is impossible to separate *C. uliginosa* Rydb. from the above. *C. uliginosa* is common in northern Indiana and *C. aparinoides* in southern Indiana (Deam, 1940). Specimens have been collected in northern Ohio which resemble *C. uliginosa* but have various characteristics of *C. aparinoides*. These plants are intermediate between what would be considered taxonomically good *C. uliginosa* and *C. aparinoides*. Most of Ohio's plants are more like *C. aparinoides*. Gleason (1952) considers the bluish flowered *C. uliginosa* to be a variety of *C. aparinoides*.

*Campanula rapunculoides* L. European Bellflower, Creeping Campanula. Perennial, stem up to a meter high, coarse, glabrous to sparsely pubescent, usually unbranched; lower leaves petiolate, cordate-ovate, upper becoming sessile, obtuse-ovate, irregularly serrate, scabrous beneath; inflorescence an interrupted raceme; flowers single in the axils of upper leaves, nodding; corolla blue, campanulate, 2 to 3 cm long; calyx hispid, smooth in *C. r.* var. *ucranica* (Bess.) K. Koch; capsules nodding, opening by pores at the base. 2n = 102.

Adventive from Europe via the northeastern U. S.; Nfld. to N. D., south to Md., W. Va., Ind., and Ill. Uncommon in Ohio (fig. 3); usually found near and around old home sites, roadsides; often well established. Late June to September June 12 (194?) to October 29 (1882).

*C. r.* var. *ucranica* has been collected in Portage and Summit counties. Several specimens examined had been identified as *C. trachelium* L. but did not have the long trichomes on the calyx typical of that species. It is quite possible that *C. trachelium* and other European species may be found as escapes near gardens, homes, etc.

*Campanula rotundifolia* L. Harebell, Bluebell. Perennial, stems short, branching profusely, up to 5 dm high; basal leaves long-petiolate, small, cordate to ovate, coarsely dentate; cauline leaves narrowly linear; flowers terminating branches; corolla blue, campanulate, 1.5 to 2.7 cm long; capsule nodding, opening by basal pores. 2n = 34, 68.

Boreal regions and south to N. E., N. J., Pa., W. Va., Mo., Neb., Tex., N. M., Ariz., and Calif. For the most part quite rare in the state (fig. 4). Collected from "limestone cliffs" in Ross County; Paulding County, no collection data; and

"Elyria", Lorain County. In Ottawa County it is quite common on limestone cliffs and rocky shores of the Erie Islands. A specimen from Erie County is in the herbarium of The University of Michigan (Voss, correspondence) but has not been examined by the author. Late June to early September. June 22 (1939) to September 28 (1930).

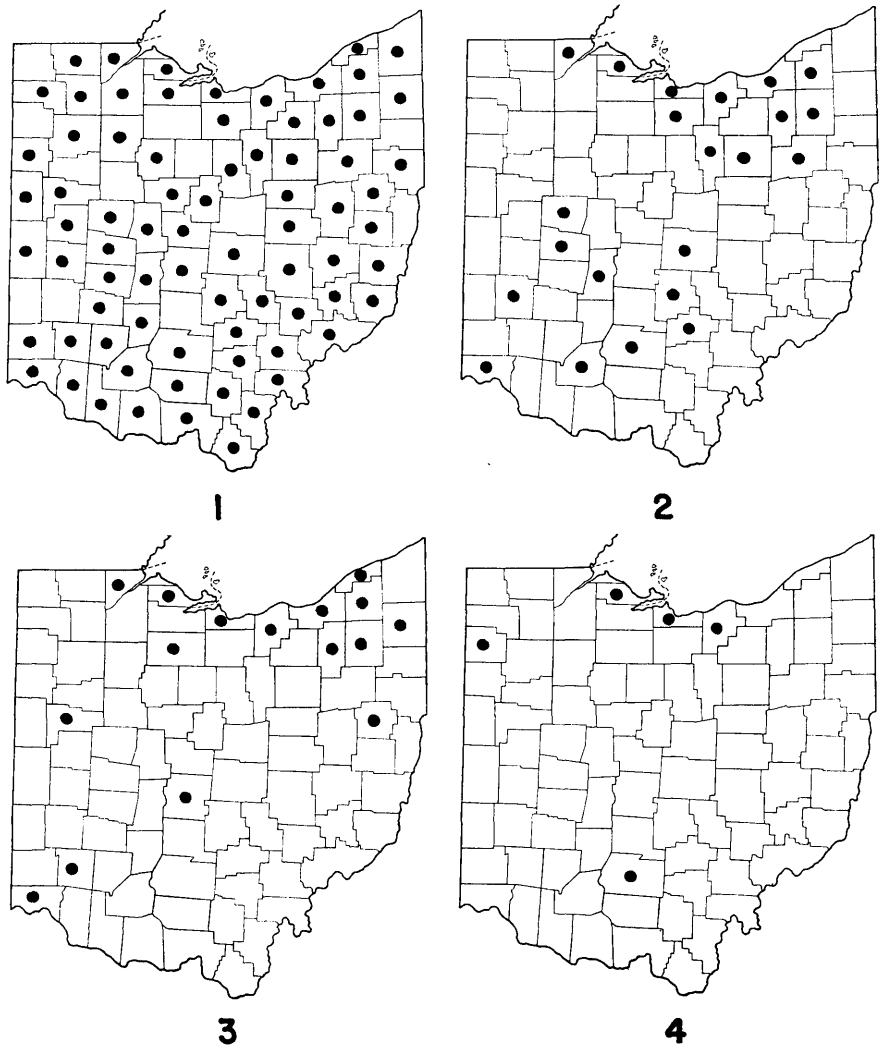



FIGURE 1 *Campanula americana*
FIGURE 2 *Campanula aparinoides*
FIGURE 3 *Campanula rapunculoides*
FIGURE 4 *Campanula rotundifolia*

All individuals from the state examined in this study are of the glabrous var. *intercedens* (Witasek.) Farw.

## *LOBELIA* L., LOBELIA

Corolla zygomorphic, with the tube split along the upper side, 2-lipped, upper lip 2-lobed, the lower 3-lobed; stamens united around the style; 2 or all 5 anthers bearded on top; carpels and locules 2; capsule opening at the top; flowers usually in racemes.

1. Flowers scarlet to red (rarely white), 3 to 4.5 cm long..... *L. cardinalis*
1. Flowers blue, bluish-white to white, 0.7 to 3.0 cm long..... 2
2. Corolla tube fenestrate..... 3
2. Corolla tube not fenestrate..... 4
3. Anthers glabrous on back, rugose; pedicels bracteolate at or above middle; calyx lobes with foliaceous basal auricles 2 to 5 mm long..... *L. siphilitica*
3. Anthers with conspicuous hairs on back; pedicels bracteolate near base; calyx lobes exauriculate or with very small auricles..... *L. puberula*
4. Lower lip of corolla smooth at base; cauline leaves linear to narrowly lanceolate; plants slender and often with filiform branches..... *L. kalmii*
4. Lower lip of corolla densely hairy at base; cauline leaves lanceolate, oblong or ovate.... 5
5. Stems long-hirsute (at least at base), usually much branched; capsules becoming inflated, included within the calyx; flowers few in open short racemes..... *L. inflata*
5. Stems not long-hirsute, simple or with few upright branches; flowers in elongate spiciform racemes; capsules not inflated, partly exserted..... *L. spicata*

*Lobelia cardinalis* L. Cardinal Flower. Perennial, stems simple, 0.4 to 1.8 m high, glabrous to short pubescent; leaves numerous, lanceolate to oblanceolate, membranous, glabrous to slightly pubescent, lower short-petioled, upper sessile or nearly so, irregularly serrate; inflorescence a raceme 10 to 40 cm long; flowers in the axils of the reduced upper leaves; corolla scarlet to red, white in *L. c.* forma *alba* (Eat.) St. John, fenestrate, 3 to 4.5 cm long. 2n = 14.

Que., s. Ont. to Minn., south to Fla. and Tex. In damp meadows, marshes, etc. Reported from 47 counties (fig. 5). An uncommon species of state-wide distribution. Very abundant locally. Late July to early September. July 18 (1895) to September 26 (1954).

*L. c.* forma *alba* has not been reported from Ohio.

*Lobelia inflata* L. Indian Tobacco. Annual, stem usually much branched, up to a meter high, obviously long-pubescent below and sometimes throughout; leaves ovate-lanceolate to obovate, sessile or nearly so, ours mostly dentate, usually pubescent beneath; inflorescence a raceme terminating the various branches; flowers blue, inconspicuous, 7 to 10 mm long; pedicel with brancteole near the base; conspicuous in fruit due to the greatly inflated calyx. 2n = 14.

Que. and Ont. to Wis. and Minn. south to S. Car., n. Ala., Miss., and Okla. Reported from 55 counties (fig. 6). Common throughout the state in open spaces and drier situations, roadsides, open woods, etc. July to September. June 19 (1895) to October 25 (1942).

*Lobelia kalmii* L. Kalm's Lobelia. Stems slender, 1.5 to 6 dm high, often branching, glabrous; basal leaves spatulate to obovate, petioled; cauline leaves long, linear to narrowly oblanceolate, sessile; inflorescence an open raceme; flowers blue, with conspicuous white spot on the throat, rarely completely white in *L. k.* forma *leucantha* Rouleau, 7 to 16 mm long. 2n = 14.

Nfld., Hudson Bay to Alb., south to N. J., Pa., Ohio, Ind., Ill., and Minn. *L. kalmi* reaches its southern limit in southern Ohio. Reported from 22 counties (fig. 7). Not a common species; calcareous and limestone cliffs, fens, non-acid meadows, etc. Only one collection in Ohio from south of the glacial border (Monroe County). Late July to September. July 13 (1899) to October 21 (1928).

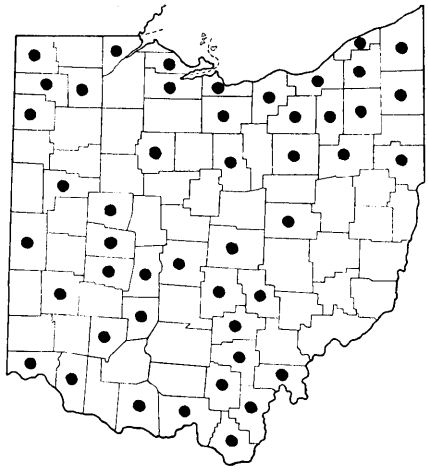
*L. k.* forma *leucantha* has not been reported from Ohio.

*Lobelia puberula* Michx. Stem usually simple, 0.3 to 1.6 m high, short pubescent throughout, rarely glabrous; leaves broadly oblanceolate to narrowly obovate, irregularly and remotely serrate to nearly entire, decreasing in size up-

wards and becoming floral bracts; inflorescence a lax to compact spike-like raceme, often one-sided; flowers blue, 1.5 to 2.4 cm long; bractlets of pedicel basal or nearly so. $2n = 14$.

Three distinct geographical varieties are recognized. Ours is *L. p.* var. *simulans* Fern. Va., W. Va. to Ill. south to Ala., Miss., and Ga. Not uncommon in southern Ohio, especially in the unglaciated area. Damp woods, thickets, quite variable according to the habitat. Reported from 11 counties (fig. 8). Late August to September. August 21 (1956) to October 15 (1932).

*Lobelia siphilitica* L. Great Lobelia, Blue Cardinal Flower. Perennial, stems coarse, 0.2 to 1.5 m high, usually unbranched, glabrous, or sparsely pubescent on



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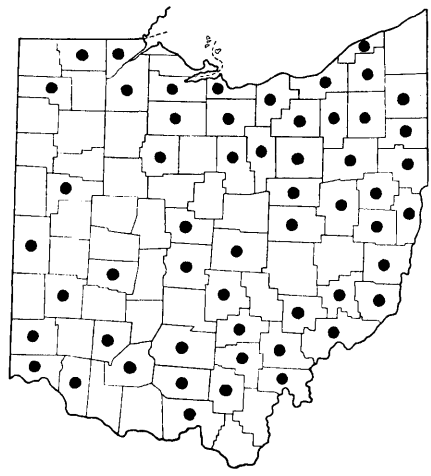

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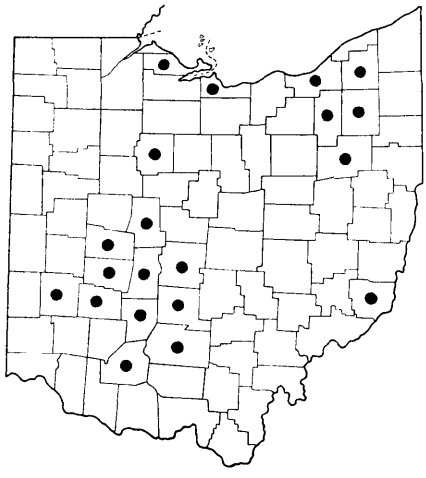

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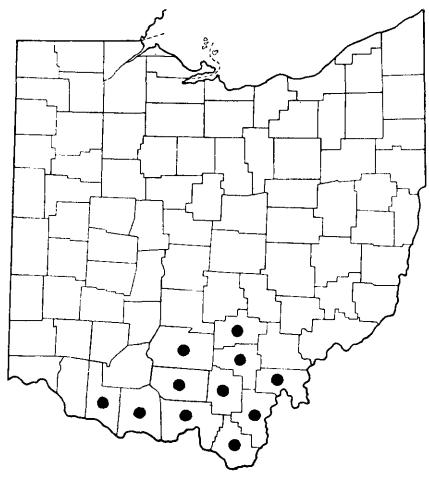

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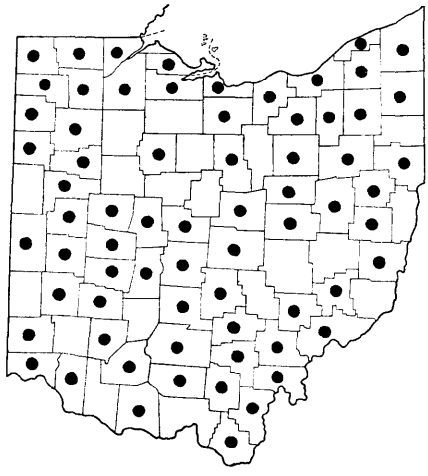
FIGURE 5 *Lobelia cardinalis*
FIGURE 7 *Lobelia kalmii*

FIGURE 6 *Lobelia inflata*
FIGURE 8 *Lobelia puberula*

the angles; leaves thin, glabrous to softly pubescent above and below, mostly ovate or elliptic to oblanceolate, dentate to irregularly serrate; inflorescence a spike-like raceme, sometimes open, usually quite compact; flowers blue, white in *L. s.* forma *albiflora* Britt., 2.3 to 3.3 cm long; calyx hirsute, glabrous in *L. s.* forma *laevicalyx* Fern. 2n = 14.

Me., s. Ont. to Wis. and Minn. south to N. C., n. Ga., Ala., Tenn., and Mo. Common throughout the state having been reported from 70 counties (fig. 9). *L. s.* forma *albiflora* has been collected in Coshocton, Hamilton and Highland Counties. Damp, low woods, swamps, etc. August to September. July 10 (1898) to October 22 (1933).



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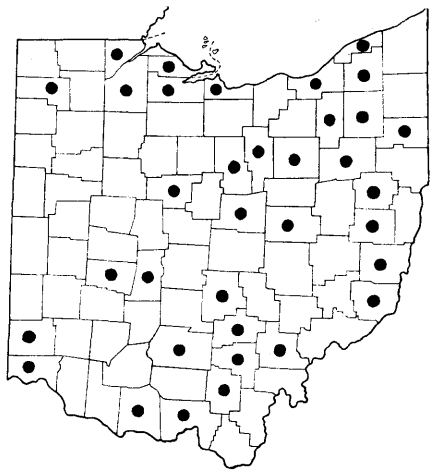

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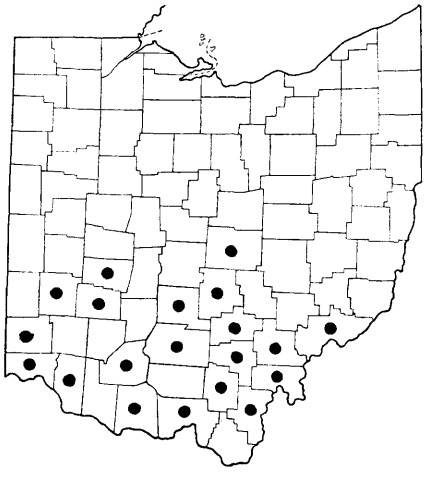

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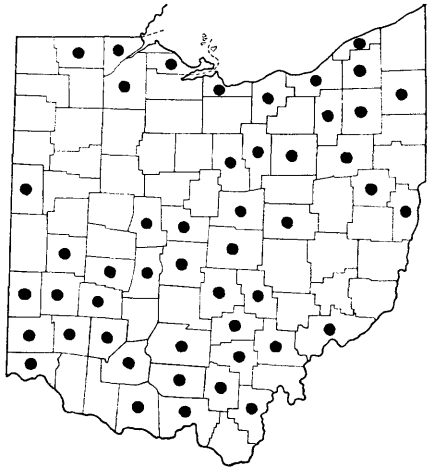

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FIGURE 9 *Lobelia siphilitica*
FIGURE 11 *Lobelia spicata* var. *leptostachys*

FIGURE 10 *Lobelia spicata* var. *spicata*
FIGURE 12 *Specularia perfoliata*

*L. s.* forma *laevicalyx* has not been reported from Ohio.

*Lobelia spicata* Lam. Pale Spike Lobelia. Stems simple, occasionally branched, 0.2 to 1 m high, pubescent at base, smooth above; leaves oblong to narrowly ovate, decreasing in size upward, ending well below the spike-like inflorescence; flowers blue to whitish, 9 to 12 mm long. 2n = 14.

The various varieties of *L. spicata* are common from N. B. and Que. to Alb. south to Ga., Ala., and Okla. Two varieties are found in Ohio, *L. s.* Lam. var. *spicata* (fig. 10) and *L. s.* Lam. var. *leptostachys* (A. DC.) Mackenz. and Bush (fig. 11). They are easily distinguished; *L. s.* var. *spicata* lacks the long filiform auricles of the calyx typical of *L. s.* var. *leptostachys*. A weed in meadows, fields, pastures, etc. A species of many habitats; it does well in comparatively wet and dry situations. June to August. May 21 (1938) to September 10 (1932).

*L. s.* var. *hirtella* Gray is found north of Ohio, according to McVaugh (1936). Plants of both Ohio varieties have been studied which have some of the characteristics of *L. s.* var. *hirtella*. It is quite possible that some introgression has occurred between these varieties of *L. spicata*.

The white-anthered *L. s.* var. *campanulata* McVaugh has been shown by Bowden (1959a) to be a pollen sterile form of the *L. s.* var. *spicata* and is considered by Bowden to be a form of that variety. Such individuals are thus classified as *L. s.* Lam. var. *spicata* forma *campanulata* (McVaugh) Bowden. This form has been collected at several stations in the state.

## *SPECULARIA* FABR., VENUS LOOKING-GLASS

Sepals 3 to 5; corolla of perfect flowers regular, rotate, 5-lobed; stamens 5, filaments hairy, shorter than the anthers; stigmas 3; capsule 3-locular, opening by 2 or 3 pores above the middle.

*Specularia perfoliata* (L.) A. DC. Venus Looking-Glass. Stems ascending, often branching near the base, pilose to hispid; leaves cordate-orbicular, sessile, clasping the stem with cordate bases, alternate, little reduced upwards; flowers sessile, single to a few in the axils of the leaves; lower cleistogamous; corollas purple; capsule opening by pores near the middle.

Common in U. S. east of the Rocky Mountains. Has been reported in 48 counties (fig. 12) in Ohio and is probably more common than indicated by collections in the various herbaria. Easily overlooked in meadows, roadsides, drier woods, etc. June to early July. May 12 (1898) to August (1933).

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